

CLAIMS

We claim:

5 1. A device for treating ischemic tissue comprising
an elongate shaft having proximal and distal ends, a lumen extending
therebetween;
a control structure operably connected to the shaft for actuation of the device by
user activation;
10 at least one injury effector adjacent the elongate shaft's distal end, and
capable of inducing a mechanical or energy injury produced at a tissue site in
response to actuation by the control structure; when the shaft's distal end is
placed against a tissue surface;
at least one therapeutic-substance delivery effector carried on the
15 elongate shaft at the distal end thereof, said therapeutic-substance delivery
effector having at least one therapeutic-substance delivery port through which
therapeutic-substance can be delivered from the effector into tissue against
which the effector is placed, each of said one or more injury-treatment effectors
and said one or more therapeutic-substance delivery ports being spaced from
20 one another at selected positions and adapted to be placed simultaneously
against such tissues; and
at least one therapeutic-substance source having a reservoir for storing a
substance and in substance communication with said therapeutic-substance
delivery ports, and responsive to said control structure to eject therapeutic-
25 substance from said reservoir through said one or more ports into such tissue,
wherein, said control structure, when activated by a user, operates to
actuate said injury-treatment effector, and additionally actuates said
therapeutic-substance source to expel therapeutic-substance through said
one or more ports to create one or more sites of therapeutic-substance
30 infusion in the tissue at defined spaced-apart locations with respect to the
created one or more sites of injury.

2. The device of claim 1 further comprising a third treatment effector for creating
a treatment position marker.

5 3. The device of claim 2 wherein the third treatment effector is separate from
the injury and therapeutic-substance delivery effectors.

10 4. The device of claim 2 wherein the marking effector is combined with either
the injury, or therapeutic-substance delivery, or injury and therapeutic-
substance delivery effectors.

15 5. The device of claim 1 wherein the injury and therapeutic-substance delivery
effectors actuate simultaneously.

20 6. The device of claim 1 wherein the injury and therapeutic-substance delivery
effectors actuate sequentially.

25 7. The device of claims 2, 3, or 4 wherein the injury, therapeutic-substance
delivery, and position-marking effectors actuate simultaneously.

30 8. The device of claims 2, 3, or 4 wherein the injury, therapeutic-substance
delivery, and position-marking effectors actuate sequentially.

25 9. The device of claims 2, 3, or 4 wherein the position-marking effector actuates
independently from the injury effectors or therapeutic-substance delivery
effectors.

30 10. The device of claim 1 wherein the therapeutic-substance-source is actuated
independent of the actuation of the therapeutic-substance delivery effectors.

30 11. The device of claim 1 wherein the therapeutic-substance-source is actuated
simultaneous to the actuation of the therapeutic-substance delivery effectors.

12. The device of claim 1 wherein the elongate shaft further comprises a steerable distal end.

5 13. The device of claim 1 further comprising an optical viewing port located at the elongate shaft's distal end in optical communication with an imaging device.

14. The device of claim 1 wherein the elongate shaft further comprises a contact sensor located on the elongate shaft's distal end.

10 15. The device of claim 1 wherein the elongate shaft further comprises a positioning aid located on the elongate shaft's distal end.

16. The device of claim 1 wherein the elongate shaft is a catheter.

15 17. The device of claim 1 wherein the elongate shaft is an endoscope.

18. The device of claim 1 wherein the elongate shaft is an open surgical hand held device.

20 19. A method of treating ischemic tissue comprising the steps of,
• identifying target tissue regions of ischemic tissue,
• providing a device that can upon activation and by a single placement of the device, cause an injury to at least one site of target tissue different than at least one site of target tissue where a therapeutic-substance is delivered,
• placing the device against the identified target tissue, and,
• activating the device to cause injury to selected sites within the target tissue, and to cause therapeutic-substance to be delivered to regions in the target tissue at preselected sites away from the sites of injury.

25 30 20. A method for treating a target tissue comprising the steps of
• identifying the target tissue

- producing one or more sites of injury within said region, where multiple sites of injury, if produced, are at known relative positions with respect to one another, and
- infusing therapeutic-substance into on or more sites different than the one or more sites of injury.

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21. A method for treating ischemic tissue comprising the steps of

- identifying a region of ischemic tissue within a patient's body
- producing one or more sites of injury within such region, where multiple sites, if produced, are at known relative positions with respect to one another,
- infusing therapeutic-substance into one or more sites different from such injury sites and at known positions away from such injury sites.